

CLAIMS

What is claimed is:

1. An overvoltage and overcurrent protection system, comprising:
a first overvoltage and overcurrent protection circuit, comprising:
a first gas discharge tube including a first electrode, a second electrode and a third electrode, the third electrode connected to a ground;
a first positive temperature coefficient resistor (PTCR) connected in series with the first electrode of the first gas discharge tube;
a first capacitor connected in parallel with the first PTCR;
a second PTCR connected in series with the second electrode of the first gas discharge tube;
a second capacitor connected in parallel with the second PTCR;
a first diode bridge connected in series with the first and second capacitors; and
a first avalanche diode connected across the first diode bridge.
2. The overvoltage and overcurrent protection system of claim 1, wherein the first diode bridge includes a first diode, a second diode, a third diode, a fourth diode, a fifth diode, and a sixth diode.
3. The overvoltage and overcurrent protection system of claim 1, further comprising:
a second avalanche diode connected in series with the first avalanche diode across the first diode bridge.
4. The overvoltage and overcurrent protection system of claim 1, further comprising:
a terminal for receiving incoming signals from an input source.

5. The overvoltage and overcurrent protection system of claim 4, wherein the terminal is configured to connect to one of a twisted pair of wires or a coaxial cable.
6. The overvoltage and overcurrent protection system of claim 1, further comprising:
a terminal for transmitting incoming signals to an output source.
7. The overvoltage and overcurrent protection system of claim 6, wherein the terminal is configured to connect to one of a twisted pair of wires or a coaxial cable.
8. The overvoltage and overcurrent protection system of claim 1, further comprising:
a second overvoltage and overcurrent protection circuit, comprising:
a second gas discharge tube including a fourth electrode, a fifth electrode and a sixth electrode, the sixth electrode connected to the ground;
a third PTCR connected in series with the fourth electrode of the second gas discharge tube;
a third capacitor connected in parallel with the third PTCR;
a fourth PTCR connected in series with the fifth electrode of the second gas discharge tube;
a fourth capacitor connected in parallel with the fourth PTCR;
a second diode bridge connected in series with the third capacitor and the fourth capacitor; and
a third avalanche diode connected across the second diode bridge.
9. The overvoltage and overcurrent protection system of claim 8, wherein the second diode bridge includes a seventh diode, an eighth diode, a ninth diode, a tenth diode, an eleventh diode, and a twelfth diode.
10. The overvoltage and overcurrent protection circuit of claim 8,

a fourth avalanche diode connected in series with the second avalanche diode across the second diode bridge.

11. The overvoltage and overcurrent protection system of claim 8, further comprising:
a terminal for receiving outgoing signals from an input source.
12. The overvoltage and overcurrent protection system of claim 11, wherein the terminal is configured to connect to one of a twisted pair of wires or a coaxial cable.
13. The overvoltage and overcurrent protection system of claim 8, further comprising:
a terminal for transmitting outgoing signals to an output source.
14. The overvoltage and overcurrent protection system of claim 13, wherein the terminal is configured to connect to one of a twisted pair of wires or a coaxial cable.
15. An overvoltage and overcurrent protection system, comprising:
a first overvoltage and overcurrent protection circuit, comprising:
a first gas discharge tube including a first electrode, a second electrode and a third electrode, the third electrode connected to a ground;
a first transient blocking unit (TBU) connected in series with the first electrode of the first gas discharge tube;
a first capacitor connected in parallel with the first TBU;
a second TBU connected in series with the second electrode of the first gas discharge tube;
a second capacitor connected in parallel with the second TBU;
a first diode bridge connected in series with the first and second capacitors; and
a first avalanche diode connected across the first diode bridge.

16. The overvoltage and overcurrent protection system of claim 15, further comprising:
a second avalanche diode connected in series with the first avalanche diode across the first diode bridge.

17. The overvoltage and overcurrent protection system of claim 15, further comprising:
a second overvoltage and overcurrent protection circuit, comprising:
a second gas discharge tube including a fourth electrode, a fifth electrode and a sixth electrode, the sixth electrode connected to the ground;
a third TBU connected in series with the fourth electrode of the second gas discharge tube;
a third capacitor connected in parallel with the third TBU;
a fourth TBU connected in series with the fifth electrode of the second gas discharge tube;
a fourth capacitor connected in parallel with the fourth TBU;
a second diode bridge connected in series with the third capacitor and the fourth capacitor; and
a third avalanche diode connected across the second diode bridge.

18. The overvoltage and overcurrent protection circuit of claim 17,
a fourth avalanche diode connected in series with the second avalanche diode across the second diode bridge.

19. An overvoltage and overcurrent protection system, comprising:
a first overvoltage and overcurrent protection circuit, comprising:

a first gas discharge tube including a first electrode, a second electrode and a third electrode, the third electrode connected to a ground;

a first PTCR connected in series with the first electrode of the first gas discharge tube;

a first capacitor connected in parallel with the first PTCR;

a second PTCR connected in series with the second electrode of the first gas discharge tube;

a second capacitor connected in parallel with the second PTCR;

a first diode bridge connected in series with the first and second capacitors; and

a first thyristor connected across the first diode bridge.

20. The overvoltage and overcurrent protection system of claim 19, further comprising:

a second overvoltage and overcurrent protection circuit, comprising:

a second gas discharge tube including a fourth electrode, a fifth electrode and a sixth electrode, the sixth electrode connected to the ground;

a third PTCR connected in series with the fourth electrode of the second gas discharge tube;

a third capacitor connected in parallel with the third PTCR;

a fourth PTCR connected in series with the fifth electrode of the second gas discharge tube;

a fourth capacitor connected in parallel with the fourth PTCR;

a second diode bridge connected in series with the third capacitor and the fourth capacitor; and

a second thyristor connected across the second diode bridge.

21. An overvoltage and overcurrent protection system, comprising:

a first overvoltage and overcurrent protection circuit, comprising:

a first gas discharge tube including a first electrode, a second electrode and a third electrode, the third electrode connected to a ground;

a first PTCR connected in series with the first electrode of the first gas discharge tube;

a first capacitor connected in parallel with the first PTCR;

a second PTCR connected in series with the second electrode of the first gas discharge tube;

a second capacitor connected in parallel with the second PTCR;

a first diode bridge connected in series with the first and second capacitors; and

a first two-electrode gas discharge tube and a second two-electrode gas discharge tube connected across the first diode bridge.

22. The overvoltage and overcurrent protection system of claim 21, further comprising:

a second overvoltage and overcurrent protection circuit, comprising:

a second gas discharge tube including a fourth electrode, a fifth electrode and a sixth electrode, the sixth electrode connected to the ground;

a third PTCR connected in series with the fourth electrode of the second gas discharge tube;

a third capacitor connected in parallel with the third PTCR;

a fourth PTCR connected in series with the fifth electrode of the second gas discharge tube;

a fourth capacitor connected in parallel with the fourth PTCR;

a second diode bridge connected in series with the third capacitor and the fourth capacitor; and

a third two-electrode gas discharge tube and a fourth two-electrode gas discharge tube connected across the second diode bridge.

23. A system for protecting networks for overvoltage and overcurrent conditions, comprising:

a first overvoltage and overcurrent protection circuit, comprising:

a first primary overvoltage protection circuit;

a first secondary overvoltage protection circuit; and

a first overcurrent protection circuit, wherein the first overcurrent protection circuit comprises a first capacitor in parallel with a first PTCR and a second capacitor in parallel with a second PTCR.

24. The system of claim 23, wherein the first primary overvoltage protection circuit comprises a gas discharge tube.

25. The system of claim 23, wherein the first secondary overvoltage protection circuit comprises a diode bridge and a first avalanche diode connected across the diode bridge.

26. The system of claim 25, further comprising a second avalanche diode connected across the diode bridge.

27. The system of claim 23, wherein the network is an Ethernet network.

28. The system of claim 23, further comprising:

a second overvoltage and overcurrent protection circuit, comprising:

a second primary overvoltage protection circuit;

a second secondary overvoltage protection circuit; and

a second overcurrent protection circuit, wherein the second overcurrent protection circuit comprises a third capacitor in parallel with a third PTCR and a fourth capacitor in parallel with a fourth PTCR.

29. The system of claim 28, wherein the second primary overvoltage protection circuit comprises a gas discharge tube.

30. The system of claim 28, wherein the second secondary overvoltage protection circuit comprises a diode bridge and a third avalanche diode connected across the diode bridge.

31. The system of claim 30, further comprising a fourth avalanche diode connected across the diode bridge.

31. The system of claim 28, wherein the network is an Ethernet network.